

GOWANS'S NATURE BOOKS

NET

1

# POND AND STREAM LIFE



BY  
WALFORD  
B.  
JOHNSON  
AND

d  
G STANLEY C. JOHNSON M.A.

LONDON & GLASGOW · GOWANS & GRAY LTD

L

1.

d.

G.

Presented by the Executors of  
Norman Douglas Simpson  
1890 - 1974

Natural History Museum Library



000097241

# Gowans's Nature Books

THE object of these little books is to stimulate a love for nature and a desire to study it.

All the volumes of the series that have been issued so far have been very successful, and the publishers hope to be able to maintain the very high standard of excellence which has made this series so well known all over the country. Some of the photographs included in the different volumes are unequalled and unique triumphs of the nature-photographer's art.

- No. 1.—WILD BIRDS AT HOME. Sixty Photographs from Life, by Chas. Kirk, of British Birds and their Nests.
- No. 2.—WILD FLOWERS AT HOME. First Series. Sixty Photographs from Nature, by Cameron Todd.
- No. 3.—WILD FLOWERS AT HOME. Second Series. By the Same.
- No. 4.—BUTTERFLIES AND MOTHS AT HOME. Sixty Photographs from Life, by A. Forrester.
- No. 5.—WILD BIRDS AT HOME. Second Series. By Chas. Kirk.
- No. 6.—FRESHWATER FISHES. Sixty Photographs from Life, by Walford B. Johnson and Stanley C. Johnson, M.A.
- No. 7.—TOADSTOOLS AT HOME. Sixty Photographs of Fungi, by Somerville Hastings, F.R.C.S.
- No. 8.—OUR TREES & HOW TO KNOW THEM. Sixty Photographs by Chas. Kirk.

- No. 9.—WILD FLOWERS AT HOME. Third Series.  
By Somerville Hastings, F.R.C.S.
- No. 10.—LIFE IN THE ANTARCTIC. Sixty Photographs from Life by Members of the Scottish National Antarctic Expedition.
- No. 11.—REPTILE LIFE. Sixty Photographs from Life, by Walford B. Johnson and Stanley C. Johnson, M.A.
- No. 12.—SEA-SHORE LIFE. Sixty Photographs by the Same.
- No. 13.—BIRDS AT THE ZOO. Sixty Photographs from Life, by W. S. Beveridge, F.Z.S.
- No. 14.—ANIMALS AT THE ZOO. Sixty Photographs by the Same.
- No. 15.—SOME MOTHS AND BUTTERFLIES AND THEIR EGGS. Sixty Photographs by A. E. Tonge, F.E.S.
- No. 16.—WILD FLOWERS AT HOME. Fourth Series.  
By Somerville Hastings.
- No. 17.—BRITISH MAMMALS. Sixty Photographs from Life, by Oxley Grabham, M.A., T. A. Metcalfe, Sydney H. Smith, and Chas. Kirk.
- No. 18.—POND AND STREAM LIFE. Sixty Photographs from Life, by Walford B. Johnson and Stanley C. Johnson, M.A.
- No. 19.—WILD BIRDS AT HOME. Third Series. By Chas. Kirk.
- No. 20.—ALPINE PLANTS AT HOME. First Series.  
Sixty Photographs by Somerville Hastings, F.R.C.S.

*Others in Preparation.*

PRICE 6d. NET. EACH VOLUME; POSTAGE 1d. EACH.

GOWANS & GRAY, Ltd., London & Glasgow

# WILD BIRDS AT HOME

(THIRD SERIES)

By CHARLES KIRK

Messrs. Gowans & Gray have much pleasure in announcing that on 1st December, 1907, they will publish a third series of WILD BIRDS AT HOME. A new series has been much asked for and will, they think, be received with delight by possessors of the two earlier volumes. Mr. Kirk has been fortunate in securing some splendid negatives during the summer, including photographs of the dipper, cormorant, eiderduck, ringed plover, snipe, etc., etc. In fact the publishers believe this series is equal to the first, which is saying a great deal.

Price Sixpence Net. Post Free Sevenpence.

Gowans & Gray, Ltd.,  
London and Glasgow.

AN ELEGANT CHRISTMAS PRESENT

# THE DESERTED VILLAGE

BY  
OLIVER GOLDSMITH

WITH 15 COLOURED ILLUSTRATIONS  
BY STEPHEN REID

PRICE, BOUND IN PARCHMENT. 5/- NET.  
POST FREE, 5/4.

A DELIGHTFUL EDITION, SIZE OF ILLUSTRATIONS  $9\frac{1}{2} \times 7$ . WE THINK IT AN IDEAL CHRISTMAS PRESENT AT THE PRICE. A COPY OF THE COLOURED TITLE-PAGE, WHICH WILL BE SENT POST-FREE ON APPLICATION, WILL SHOW THE STYLE OF THE PICTURES.

Gowans & Gray, Ltd., London and Glasgow

MISCELLANEOUS NEW SIXPENNIES

CHRISTMAS, 1907

---

## THE MASQUE OF THE TWO STRANGERS

BY LADY ALIX EGERTON

A delightful little play which was performed with  
great success at Stafford House.

PARCHMENT COVER, 6d. NET. POST FREE, 7d.

---

## PILGRIM'S PASSAGE

BY THE REV. A. BOYD SCOTT, B.D.

Seven pleasant addresses in a simple and uncon-  
ventional style dealing with man's pilgrimage  
through this world.

PARCHMENT COVER, 6d. NET. POST FREE, 7d.

---

## CHARDIN AND HIS TIMES

BY HERBERT E. A. FURST

WITH 24 ILLUSTRATIONS

IN THE SAME STYLE AS OUR ART BOOKS.

A lecture delivered at the Whitechapel Art Gallery.  
Deals with the great French painter in a popular  
and very instructive way.

PARCHMENT COVER, 6d. NET. POST FREE, 7d.

---

Gowans & Gray, Ltd., London & Glasgow

# POCKET ANTHOLOGIES

Compiled by ADAM L. GOWANS, M.A.

*42nd Thousand.*

No. 1.—**The Hundred Best Poems (Lyrical) in the English Language.**

*21st Thousand.*

No. 2.—**The Hundred Best Poems (Lyrical) in the English Language. Second Series.**

*12th Thousand.*

No. 3.—**The Book of Love.** One hundred of the best love-poems in the English language.

*6th Thousand.*

No. 4.—**The Hundred Best Blank Verse Passages in the English Language.**

*6th Thousand.*

No. 5.—**Poetry for Children.** One hundred of the best poems for the young in the English language.

*Just Published.*

No. 6.—**The Ways of God.** One hundred poems on the great problems of existence.

*Others in Contemplation.*

## PRICES :

Paper, 6d. Net.

Cloth, 1s. Net.

Leather, 2s. Net. Postage, 1d. each.

**GOWANS & GRAY, Ltd., London & Glasgow.**



# GOWANS'S ART BOOKS

THIS Series, published at a very low price and containing Sixty beautifully-printed reproductions of the best pictures of the great masters, is intended to give the lover of art a general idea of the style and characteristics of the most famous painters of the world.

- No. 1.—The Masterpieces of Rubens
- No. 2.—The Masterpieces of Van Dyck
- No. 3.—The Masterpieces of Rembrandt
- No. 4.—The Masterpieces of Raphael
- No. 5.—The Masterpieces of Reynolds
- No. 6.—The Masterpieces of Teniers
- No. 7.—The Masterpieces of the Early  
Flemish Painters
- No. 8.—The Masterpieces of Titian
- No. 9.—The Masterpieces of Franz Hals
- No. 10.—The Masterpieces of Murillo.
- No. 11.—The Masterpieces of Wouwerman
- No. 12.—The Masterpieces of Velazquez
- No. 13.—The Masterpieces of Holbein
- No. 14.—The Masterpieces of Veronese

*Others in Preparation.*

PRICES: PARCHMENT COVERS, 6d. Net. CLOTH, 1s. Net.  
LEATHER, 2s. NET. POSTAGE, 1d. EACH.

Gowans & Gray, Ltd., London & Glasgow

# Humorous Masterpieces

**E**ACH volume contains Sixty of the very best Drawings of the undermentioned Masters of Humorous Illustration.

*READY*

**No. 1.—PICTURES BY JOHN LEECH**  
**FIRST SERIES**

These Pictures are not old fashioned. They are as funny to-day as when they were first published.

**No. 2.—PICTURES BY GAVARNI**

Examples of one of the greatest French Humorists.

**No. 3.—PICTURES BY JOHN LEECH**  
**SECOND SERIES**

Just as good as the first series.

**No. 4.—PICTURES BY ROBERT SEYMOUR**

Clever Illustrations by a great Artist, too little known.

**No. 5.—PICTURES BY PHIL MAY**

Sixty of his best.

**No. 6.—PICTURES BY RICHARD DOYLE**

Clever Caricatures by this famous Artist.

*Others in Preparation*

PRICE 6D. NET. EACH VOLUME (POST FREE 7D.)

**GOWANS & GRAY, Ltd., London & Glasgow**

GOWANS'S NATURE BOOKS, No. 18



## POND AND STREAM LIFE

CARSON & NICOL PRINTERS, GLASGOW.

BLOCKS BY HISLOP & DAY, EDINBURGH.



S. C. Johnson, Photo.

COMMON HOUSE LEECH  
(*Hemopsis gulo*)

# POND AND STREAM LIFE

*Sixty photographs from life by Walford B. Johnson and  
Stanley C. Johnson, M.A.*

GOWANS & GRAY, LTD.  
5 ROBERT STREET, ADELPHI, LONDON, W.C.  
58 CADOGAN STREET, GLASGOW

1907



*THIS little volume is intended to serve as a pocket companion to the pond-hunter during his rambles in search of specimens. The majority of the larger insects, molluscs, etc., which will be found in the net have been figured in its pages, whilst the whole seven Batrachians indigenous to Britain are also represented. The fishes are excluded, as they were treated in an earlier volume of this series, entitled "Freshwater Fishes." The scientific nomenclature is taken from "Life in Ponds and Streams," by Mr. W. S. Furneaux, and the plates are so arranged that each creature belongs to a lower form of life than the one immediately following it. The reader is particularly referred to the photographs (pp. 43-58) illustrating the life-history of the Frog and to those depicting the metamorphoses undergone by the Dragon Fly (pp. 18-23).*



FRESHWATER MUSSEL  
(*Anodonta cygnea*)

W. B. Johnson, Photo.





FIG. 10. *Paludina vivipara*  
(*Paludina vivipara*)



RAMSHORN SNAIL  
(*Planorbis cornuc*)

W. B. Johnson, Photo.



S. C. Johnson, Photo.

FRESHWATER WHEEL  
(*Limnoria stagnalis*)



SPAWN OF FRESHWATER WHEEL

*S. C. Johnson, Photo.*



RIVER CRAYFISH  
(*Astacus fluvialis*)

W. B. & S. C. Johnson, Photo.



WATER SPIDER  
(*Argyroneta aquatica*)

W. B. Johnson, Photo.



W. B. Johnson, Photo.

PUPA OF WATER BOATMAN  
(*Notonecta glauca*)



WATER BOATMAN

*W. B. Johnson, Photo.*





*W. B. Johnson, Photo.*

WATER BOATMAN  
(Underside)



LARVA OF WATER SCORPION  
(*Nepa cinerea*)

W. B. Johnson, Photo.



W. B. & S. C. Johnson, Photo.

WATER SCORPIONS



PUPA OF DRAGON FLY  
(*Ecdyonurus tenax*)

W. B. Johnson, Photo.



*W. B. Johnson, Photo.*

PUPA OF DRAGON FLY  
(Underside, showing mask)



TRANSFORMATION OF  
DRAGON FLY—I.  
(See Notes)

*W. B. Johnson, Photo.*



TRANSFORMATION OF  
DRAGON FLY—II.

*W. B. Tinsley, Photo.*



TRANSFORMATION OF  
DRAGON FLY—III.

*W. B. Johnson, Photo.*





W. B. Johnson, Photo.

THE PERFECT DRAGON FLY (reduced) — — —  
(*Erythemis gamma*)



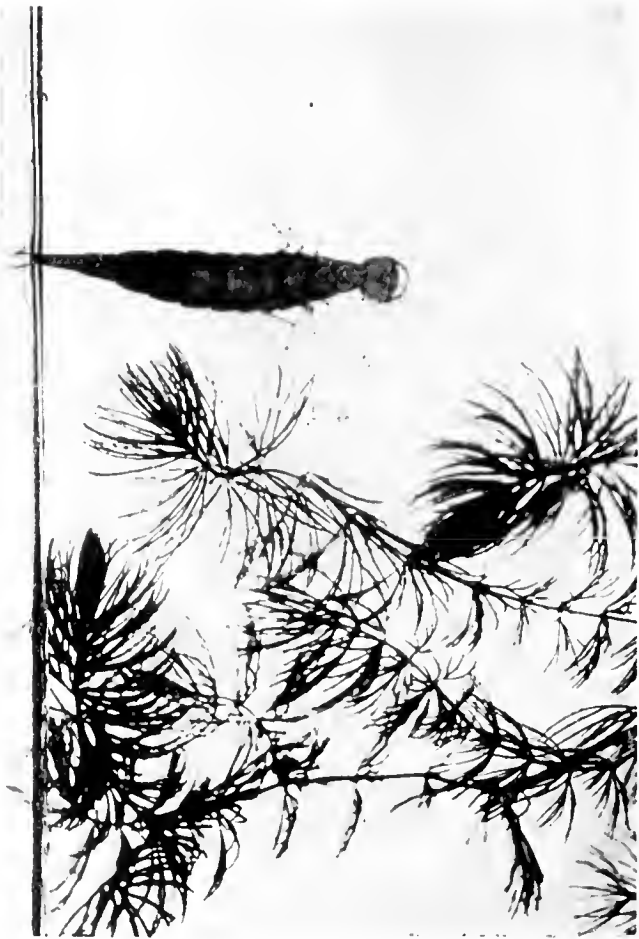
DRAGON FLY  
(*Enallagma cyathigerum*)

W. B. Johnson, Photo.



LARVA OF GREAT DIVING WATER BEETLE  
(*Dytiscus marginalis*)

W. B. Johnson, Photo.



LARVA OF GREAT DIVING WATER BEETLE  
(Breathing at the surface)

*W. B. Johnson, Photo.*



GREAT DIVING WATER BEETLE

W. B. &amp; S. C. JOHNSON, PHOTO.



GREAT DIVING WATER BEETLE

*W. B. & S. C. Johnson, Photo.*



W. B. Johnson, Photo.

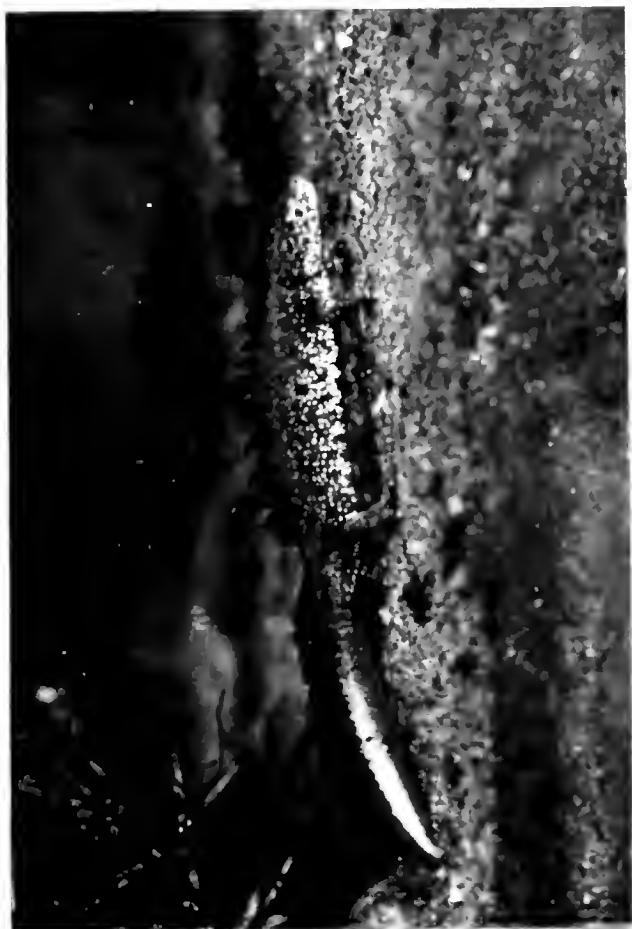
SILVER WATER BEETLE  
(*Hydrophilus piceus*)



*H. B. Johnson, Photo.*

SILVER WATER BEETLE  
(Underside)





TRITON OR GUPPY CROCOD: NEW GUINEA (male)  
*(Amphispelta novae-guineae)* *Reed, 1939, Photo.*



FEMALE TRITON

*W. B. Johnson, Photo.*



FEMALE TRITON

*W. B. Johnson, Photo.*



FEMALE TRITON (underside)

*W. B. Johnson, Photo.*



Young Male (male)  
*Masticophis lateralis*

Photo by J. R. ...



SMOOTH NEWT (male)  
(Underside)

*W. B. Johnson, Photo.*



SMOOTH NEWT (female)

*W. B. Johnson, Photo.*



SMOOTH NEWT (female)  
(Underside)

W. B. Johnson, Photo.





*H. H. Johnson, Field.*

Smooth Newt (female)  
(With an extra right fore leg)



SMOOTH NEWTS

*W. B. & S. C. Johnson, Photo.*



SMOOTH NEWT  
(during summer)

*W. B. Johnson, Photo.*



PALMATED NEWT (male)  
(*Molge palmata*)

W. B. Johnson, Photo.



FIG. 1. SAWYER POND.



TRANSFORMATION OF FROG SPAWN—I.  
(See Notes)

W. B. & S. C. Johnson, Photo.



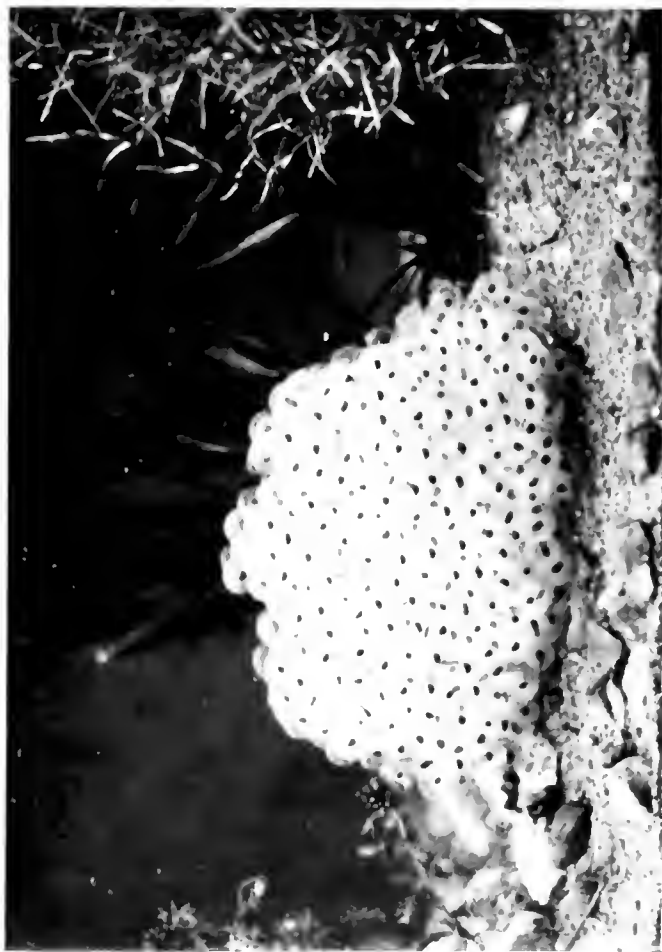
TRANSFORMATION OF FROG SPAWN. II. W. B. & S. C. JOHNSON, PHOTO.



TRANSFORMATION OF FROG SPAWN—III.

*W. B. & S. C. Johnson, Photo.*





TRANSFORMATION OF FROG SPAWS—IV. W. B. & S. C. JOHNSON, PHOTO.



TRANSFORMATION OF FROG SPAWN—V.

*H. B. & S. C. Johnson, Photo.*



*W. J. S. S. C. J. S. S. C. J. S. S. C. J. S. S. C.*

TRANSFORMATION OF EGG STAGES. VI.



TRANSFORMATION OF FROG SPAWN—VII.

*W. B. & S. C. Johnson, Photo.*



TRANSFORMATION OF FROG SPAWNS. VIII. — *H. R. & S. C. Lucas, Jr. Photo.*



TADPOLE OF FROG (underside)  
(Before appearance of Hind Legs)

*S. C. Johnson, Photo.*



*S. C. Johnson, Photo.*

TADPOLE OF FROG;  
(Hind Legs developing)



TADPOLE OF FROG  
(Hind Legs fully formed)

*S. C. Johnson, Photo.*





TADPOLE OF FROG  
(Front Legs burst out)

*S. C. Johnson, Photo.*



TADPOLE OF FROG  
(Tail beginning to be absorbed)

*S. C. Johnson, Photo.*



W. B. Johnson, Photo.

Common Frog,  
(*Rana temporaria*)



*W. B. Johnson, Photo.*

COMMON FROG







TADPOLE OF TOAD  
(Hind Legs just appearing)

*S. C. Johnson, Photo.*



COMMON TOAD (male)  
(*Bufo vulgaris*)

W. B. & S. C. Johnson, Photo.





COMMON TOAD (female)  
(Under water)

*W. S. Johnson, Photo.*



NATTERJACK TOAD  
(*Bufo calamita*)

W. B. Johnson, Photo.

# Some Notes on the Creatures

OF WHICH

PHOTOGRAPHS APPEAR IN  
THE FOREGOING PAGES . .

BY

WALFORD B. JOHNSON.

---

Before describing in detail the creatures figured in the preceding illustrations it would be as well to give some idea as to the best places to find them and the most advantageous method of effecting their capture. Without some means of catching them it would be almost impossible for anyone to be certain of meeting with the wholly aquatic forms, for many lie buried in the mud during the daytime and only come out to feed during the night. Therefore some way of making them come to us must be devised before we can hope to make their acquaintance. Of course, everything required for such work in the way of nets, cans, and other impedimenta can be purchased from the numerous dealers in those articles, but if desired most serviceable nets may be made at home with some stout iron wire and a yard or two of "leno." Most of the frames are made circular, but a more satisfactory shape is that of a triangle. A net made on the latter principle will fit the bottom of a pond much better than the other and let far less of the creatures to be captured pass under it. A piece of stout string (Venetian blind cord is the best for the purpose, as it does not fray in the water) should be tied to each of the three corners of the net frame, and about a yard distant from it they should be all three knotted together. Any long length of cord should now be attached to this, and the whole will make a very serviceable dredge, which will if necessary reach the middle of the pond. A hand-net is very useful at times, but the creatures which are wanted most have a nasty habit of remaining just two inches beyond its longest reach. A can may be taken to the scene of operations to bring home the captives if desired, but it is not necessary, for all the creatures figured in the illustrations can be transported long distances wrapped in wet or even moist water weed, so long as they are kept cool. Almost every pond that is permanent will yield some aquatic life all the year round, even when covered with a layer of ice, but the waters which contain most are those with an abundance of healthy aquatic plants growing in a thick layer of mud. Here almost every kind of pond life will find ample food and shelter. Though every season of the year the ponds will be tenanted with a variety of life, the very best time for the naturalist is between early spring and midsummer. Then it is that the temporary inhabitants of the water will be undergoing their metamorphoses. If the pond and season have been properly chosen, each time the net is landed it will be found to contain several newts, scores of wriggling tadpoles, and numbers of jumping water insects. The dredge should be weighted at one side, thrown out a good distance, and allowed to sink as deep as it will. Then it must be drawn over the bottom, passing through as much of the weed as

possible. When at the end of the drag the net should be quickly lifted, otherwise half the captives will escape. The contents of the net must be turned out on the smoothest piece of ground available and be subjected to the strictest scrutiny, for many of the most treasured specimens will lie motionless and quite hidden in the masses of weed dredged up. It is a good plan to have a supply of small tin boxes ready, each very loosely packed with wet weed. Beetles may be put into one, leeches into another, a third may be reserved for scorpions, and so on. If an assortment of these insects be carried any distance in water some of them will be sure to disappear down the throats of their more robust companions. The above method of packing will reduce this cannibalism to a minimum, for when out of water these insects seem to desire no food.

### VERMES (*Worm-like Creatures*).

**Common Horse Leech.**—The first few drags of the net are almost sure to bring out several of these leeches. Our illustration depicts a fairly large specimen crawling over the glass side of an aquarium, and shows the circular sucking discs which enable the creature to hold on to smooth surfaces. Leeches are very worm-like in appearance, and are capable of considerable expansion and contraction in length. When swimming they move rapidly through the water by a series of undulatory movements, suggesting somewhat the action of an eel. The colour varies from a dull brown to a light yellow, according to the nature of the bottom of the pond. They are very hardy creatures, and will live in almost any aquarium under the most adverse circumstances provided the tank is kept cool. When in captivity they will readily take earthworms for food; and as they are such expert climbers the tank containing them must be covered with some perforated material.

### MOLLUSCS.

**Freshwater Mussel.**—For these molluscs we must search either in fair-sized lakes or in rivers. In such situations they lie half buried in the mud and require the aid of the dredge to dislodge them. If one of these Swan Mussels, as they are sometimes called, be carefully examined, it will be found to possess two shells jointed together by an elastic hinge, and held tightly closed by the powerful adductor or closing muscles of the animal. But if it be placed in some vessel of water with a thick layer of sand on the bottom and left undisturbed, the mussel will, after a time, gradually separate the two valves and protrude a mass of yellow flesh known as the foot. This will slowly burrow into the sand and work the shell into a semi-upright position, as seen in our illustration. After the animal has buried about three-quarters of its shell and made itself quite at home in its new surroundings, a careful examination of the upper part will reveal two peculiar processes between the shells. These are the siphons which constantly pass a current of water through the creature's body. The gills extract the oxygen, and the digestive apparatus filters off the microscopic green plants upon which the animal subsists. The inhalent siphon is furnished with a number of tentacles which guard the entrance and prevent the inflow of any inconveniently large particles. These mussels are capable of moving considerable distances, though their ploughing through the sand is very slow.

**Freshwater Winkle.**—This water snail is fairly common in lakes and sluggish rivers in some parts of Britain, but it is very local. The shell is of a dull yellowish colour, marked with bands of purplish brown, and at first sight it looks very much like a big

periwinkle. The likeness is further strengthened by the presence of a hard horny covering, known as the operculum or cap, which exactly fits the opening of the shell, and protects the more delicate parts within. If one of these snails be dropped into an aquarium, after it has satisfied itself that danger is past, it will slowly put out its two very winkle-like horns, and begin crawling over the stones in search of food. When in this position it is quite easy to see to which portion of the animal the operculum is attached. It is carried, as in winkles, whelks, and all the marine univalves possessing one, immediately behind the shell, so curiously enough this snail carries its cap on its tail.

**Ramshorn Snail.**—This water mollusc is common in almost every pond and stream in Britain, and has a special taste for decaying vegetation. A dozen or so of these snails should be kept in every fair-sized aquarium, as they will do good service in removing small bits of rotting waterweed, which if left would discolour the water and render it foul. The shell is usually covered with a green water-growth in the larger specimens, but if this is cleaned off the real colour will be found to be a shining chocolate brown. Their eggs which are enclosed in elliptical jelly-like cases, are fixed to water plants.

**Freshwater Whelk.**—One of the very first creatures to make the acquaintance of the pond-hunter is this snail. It seems to be very common in most waters in the south of England, but its favourite haunts are weedy ponds. In such situations numbers may often be seen swimming in an inverted position on the surface of the water. The eggs are laid on submerged portions of aquatic plants in long jelly-like capsules. In a few weeks the tiny snails make their appearance and wander off in search of food. This consists of vegetation chiefly, but the full-grown molluscs will readily become carnivorous. In an aquarium of the writer six of these mature whelks cleaned off every shred of flesh from a dead young roach, which was quite three inches long, and this they managed in less than a fortnight.

## CRUSTACEANS.

**River Crayfish.**—To obtain these crustaceans we must go down to the banks of some river towards dusk. If the stream be a likely one numbers of crayfish will be seen sallying forth from their holes in the banks hunting for food. Frequently they may be met with during the day, but, as they are essentially nocturnal in their habits, they are far more likely to be found towards evening. The crayfish is a member of the family to which the lobster belongs, and is protected in the same way by a horny covering. This armour is formed of a very tough skin made still harder by the deposition of chalk. This is supplied in the substance of the water weeds which form a large portion of the diet of this animal. We should expect, then, to find crayfish in rivers whose waters contain a certain amount of calcareous substance, as, for the reason just stated, they will not thrive in streams which do not flow through chalky districts. To keep these creatures healthy in aquaria, an almost constant supply of water must be maintained, for, if not, they become limp and sluggish, and very soon die. They will partake of almost anything in the way of meat and vegetables, but, of course, small pieces of fish and water weeds will suit them best. All the food not eaten will, if not removed, cause the fouling of the water and the death of the crayfish. A shallow vessel well supplied with heaps of big stones, under and among which they can hide, will also be good for their health.

**Water Spider.**—When dredging some ponds the net will often contain a few specimens which are unmistakably spiders. They are quite dry, and yet a moment before they were below the surface of the water. These creatures are specially designed to lead an aquatic existence. Like their terrestrial brothers, they breathe atmospheric air, and have no power of extracting the dissolved oxygen from the water as fishes do. These spiders are densely covered by short hairs which are not easily wetted. Consequently, when they descend below the surface of the water by crawling down the stem of some aquatic plant, a quantity of air adheres to the creatures' bodies and gives them the appearance of globules of silver. This air sticking to their abdomens supplies them for some time with the oxygen necessary for respiration. When this is exhausted, the creatures have to revisit the surface for a fresh supply. They have also another method which enables them to stay below the water for a number of hours. Each spider spins a silken chamber among the water weeds, which, when complete, resembles a bell, the open end pointing downwards. The spider then pays a visit to the surface, walks down the stem of some water plant with a bubble of air adhering to its body, stands below its newly-constructed cell and shakes it self. Some of the air is dislodged from the creature's body, and in rising is caught in the silken chamber above. This process is repeated till the spider is satisfied with the amount of air it has stored. Then off it goes in search of food. This consists of any insect not too strong to master, and it may be caught either below the surface or on the leaves of some plant growing on the margin of the pond. The capture is made not by snaring, as in most other spiders, but by a sudden pounce. Should the victim offer any considerable resistance, poison is promptly injected by its captor. This has a very quieting and stupefying effect, and without further trouble the spider carries it down to its cell and devours it at leisure. If this silken apartment be torn, another is quickly constructed, for the creature spends most of its time there. A special one is woven by the female to receive the egg-cocoon. During the winter, respiration is all but absent, and these spiders shut themselves up in their silken homes till the return of spring, when once more their energies are renewed.

### AQUATIC INSECTS.

**Water Boatman.**—Any one who goes cautiously up to the edge of almost any pond, during the spring and summer months, will notice a number of dark-coloured insects floating on the surface. At the least sign of danger they rapidly dive, but they rise again as quickly as they disappeared. These are the insects popularly called Water Boatmen, on account of their two oar-like legs which propel them. Curiously enough, they swim on their backs and breathe through their tails, rising constantly to the surface to renew their air supply. If one be taken from the water and placed on land, it will jump and hop about by means of these oar-like legs, and crawl like any other insect with its back uppermost. Then it will be noticed that the dorsal parts are light-coloured, and that four wings are wrapped tightly against its body. When returned to the water it immediately assumes its favourite inverted position. It is very predaceous, feeding on any animal, dead or alive, altogether regardless of its size. If a number of these insects be kept together without food, after a day or two only one will remain, and the indigestible portions of the others, such as legs and wings, will be scattered round the containing vessel. They are strong fliers so that the aquarium in which they are confined should be kept covered. The female lays her eggs on the submerged stems of water

plants. These hatch out to creatures very similar in appearance to their parents, but of course much inferior in size. At this, the larval stage, they possess no wings. After a time the insect moults, becoming a pupa, and then displays two flaps at its sides, which are the rudimentary wings. At a still later period there is another moult, this time the boatman becomes a perfect insect, with full powers of flight. It might be explained here that the larval state, as mentioned above, is exactly analogous to the caterpillar stage of a butterfly, and the pupa to the chrysalis.

**Water Scorpion.**—There will be no difficulty in the identification of this insect, for it is quite unlike any other to be found in the pond. Though broad when seen from above, it is almost as thin as a sheet of paper when viewed laterally. The colour is very mud-like on the back, and admirably conceals the insect as it crouches at the bottom of the water waiting for prey. When within reach, the victim is seized by the front pair of legs and pressed against the beak-like sucking organ situated between them. These front legs are very curious, for they fold in the same way as a penknife shuts into its handle. As in all the other insects described, the scorpion has to constantly visit the surface to renew its air supply. This is done very quaintly by pushing the tip of the tail filament above the water. As it is hollow, air can be drawn down to the creature's spiracles or breathing holes, and held there until all the oxygen is exhausted. This insect is a fairly strong flier, though it seldom makes use of its powers in this direction.

**Dragon Fly.**—Almost every one is acquainted with the wonderful metamorphoses through which a butterfly passes to attain its perfect state. Beginning life as an egg it hatches to a caterpillar, whose sole aim is to eat and grow to lay up energy and strength for its after life. When full-fed this grub casts its skin and becomes a chrysalis. In this stage it is absolutely unable to take food, and, but for a few jerking actions of its body, it is incapable of movement. When the development is complete, it emerges as a perfect insect, and the whole cycle of this life begins again. Now, in the case of a dragon-fly, the conditions are very similar, though they differ in a few important details. The egg is laid singly on the aerial portion of some water-plant by the female dragon-fly, and when the larva is hatched it has not far to go before it reaches the element in which it is destined to spend the major part of its career. The little creature has six legs, and is very similar in appearance to the pupa figured in our illustrations, though of course it is much smaller. Its appetite is enormous, and its one and only thought is to eat. In spite of this it grows slowly, for some three seasons will be spent in preparing itself for its final change to a perfect dragon-fly. When it has reached a length of about an inch and a half a moult takes place, which is quite different from those previously made. This time the insect appears from out its old skin with two small processes on its shoulders, which will later develop the well-known gauzy wings of the perfect insect. The creature is now a pupa, a stage analogous to the chrysalis of the butterfly. But instead of being quiescent this pupa is even more voracious than it was in its earlier stages. If our illustration, "Underside, shewing mask," be consulted, there will be noticed a curious triangular plate tightly fixed to the under part of the head. This plate, which is known as the mask, is hinged at its hinder end to an arm which is concealed beneath it, and which in its turn is hinged to the lip of the insect. The mask, moreover, has at its free end a pair of claw-like seizing appendages. It will be readily seen, then, that this mask is capable of being unfolded, so that it reaches to some distance in front of the insect's mouth.

When hunting for food the creature slowly crawls about until its keen eyes spy some likely victim. Cautiously it approaches its prey until within about half an inch of it. Then with a rapid movement, the mask is unfolded and shot out, and the victim is seized and dragged to the mouth of its captor. The true jaws are now brought into action and pieces are bitten from the victim, which all the while is held firmly by this mask. When crawling over the mud and water weeds hunting for prey the creature uses its six legs, which, however, are useless for rapid progression. When alarmed it presses its legs flat against its body and shoots through the water with considerable rapidity. But by what means it swims is a puzzle to many, for it seems to be jerked along by an invisible thread pulled by some invisible hand. The abdomen is hollow, and by means of powerful muscles is made to expand to its largest size. Water then rushes in through an orifice at the tail. These muscles then cause the abdomen to suddenly contract and forcibly eject the water contained within. This latter action has the effect of swiftly forcing the creature forward. When the insect swims this alternate action is rapidly repeated and maintained. This is quite easily demonstrated by putting the creature in some transparent vessel of water, the bottom of which has a thin coating of clean sand. When the dragon-fly pupa swims about near the bottom, sand will be blown away like dust by the jets of water extruded by the insect. When the pupa is full fed it chooses some water plant which has leaves growing above the surface of the pond. Up this stem it climbs until its head is just above the water. In this position it remains for some hours, while rapid development is going on within. Shortly after dusk the creature suddenly runs to the top of the water plant, remaining there in an inverted position for about an hour. A slight wriggling occurs, and all at once the skin splits down the back just between the wing cases. Slowly the delicate green shoulders of the future dragon-fly appear from out of this slit and are gradually followed by the head, with its enormous shining pair of compound eyes. Next the legs are drawn out, and part of the body is wriggled from the old skin. All this so far has taken barely ten minutes, and now the creature hangs to the old pupal skin by means of its tail. (See illustration on Page 20.) Limp and motionless, it remains so suspended for fully half an hour to rest after its exhausting struggles. There is another sudden movement, and this time the insect has jerked itself up, taken hold of the old skin with its legs, and dragged out the remainder of its body (Page 21). The wings, which are now merely limp flaps the size of the old wing cases, begin to expand, for blood is being pumped into them from the creature's body. In less than ten minutes these are fully expanded (Page 22), and now the insect is a fully-formed dragon-fly, though its wings are still limp and its colours very faint. In this position it hangs all night. By the time the morning sunshine has appeared its wings will be hard and its colours bright. In the first gleam the newly-born dragon-fly is off on the wing searching out flies, butterflies, and even its own species to appease its hunger. These insects seldom seem to be flying in dull weather, but are particularly active during a scorching summer day. As perfect insects they live from one to two months, feeding voraciously during every fine day. These transformations almost invariably take place after dark about July or August; but the insect figured was rather exceptional, being the only one out of some three hundred pupa confined which emerge during daylight. There are many species of dragon-flies found in Britain, and all pass through metamorphoses as described. Sometimes on fine summer days the sedges by the river banks are alive with these small delicately-coloured insects, some blue, others red, while a



third kind have bright, metallic green bodies. The one in our illustrations (*Enallagma cyathigerum*) has a bright blue body ringed at intervals with dark brown.

**Great Diving Water Beetle.**—This insect is very commonly met with while pond hunting. Its colour is a deep, brilliant green on the back and glossy brown beneath. As its specific name implies, a margin of yellow outlines the dorsal surface. The sexes may be distinguished easily, for the back of the male is quite smooth, while that of the female is longitudinally grooved. These insects are, if possible, more predaceous than the Water Boatman, readily devouring tadpoles, newts, and all the soft-bodied creatures which share their haunts. Should this food run short they will devour one another with avidity. Like many other aquatic insects, they are surface breathers, rising regularly to replenish their stock of air. This is carried between the wings and body, and experiments made on one of these creatures showed that the air so contained will last them for an hour or more. The larva is a very curious object, quite unlike the perfect insect. It is as transparent as a shrimp and is not at all unlike one at first sight. It is very voracious, its appetite being almost insatiable. As it is rather a weak swimmer it prefers to crawl about over the mud and capture its unwary victims by stealth. Its colour is so mud-like that the victim's first intimation of its proximity is the snap of the sickle-like jaws across its body. These jaws are hollow throughout and have tiny orifices at their tips. Through these holes the juices of the prey are sucked till little remains of it besides the horny covering. Towards the end of July the larva, which has hitherto breathed from the surface through its tail, quits the water and burrows into the soft mud well above the water line. After working itself round and round for some hours an oval chamber is formed, and at the bottom of this the exhausted creature lies upon its back. Gradually its length shrinks, till after about a week the skin splits down the shoulders, and with much wriggling the old skin is cast off, leaving a quiescent pupa. This is quite white, and has the wing and leg cases standing out from the body—not fused smoothly together, as in the case of chrysalides of moths and butterflies. After some three or four weeks the skin at the back again splits, and this time the perfect beetle emerges.

**Silver Water Beetle.**—This insect is not nearly so common as the one last described, but in some neighbourhoods it seems very plentiful. Unlike the Diving Beetle, it subsists entirely upon pond weeds, and may be safely kept in aquaria with fishes without fear of its attacking them. Rather larger than *D. marginalis* it is of a deep olive green on the back, while the under surface is given a yellowish-brown appearance by a dense covering of short hairs. These bristles, as in the case of the aquatic spiders, prevent the water wetting the under surface of the insect, and so carry a supply of air on which the creature draws whilst submerged. When below the surface the under parts of this beetle have a very silvery appearance. If our illustrations of the two beetles be consulted it will be readily seen that *D. marginalis* has specially-developed oar-like legs which carry it rapidly through the water, while *H. piceus* has legs like any terrestrial beetle, and consequently its swimming is somewhat slow and laboured compared with that of the diving beetles. The larva of this species is very similar in appearance to that of *D. marginalis* and quite as voracious, feeding on any soft-bodied animals which it can capture. The pupa, too, is similar to that of the last-named beetle, but the eggs of *H. piceus* are enclosed in a hard cocoon which is fixed to a submerged plant.

## BATRACHIANS.

**Newts.** — Almost every established pond teems with these creatures during the spring and early summer months. As soon as the winter has passed newts give up their terrestrial habits and become aquatic. When they first enter the water the sexes look very much alike, but if the weather be congenial the male smooth newt soon assumes an olive hue on the upper parts, while underneath bright spots of red and yellow appear. At the same time the thin narrow tail gradually broadens and becomes more suited for swimming, and a crest forms down the back from the head to the tip of the tail. The female, however, does not put on such a gorgeous uniform; she merely assumes a light mud colour on the dorsal parts, while below she is creamy white. The tail also broadens, but no appreciable crest appears. A few weeks after entering the ponds she begins to lay her eggs singly. Carefully she bends over a leaf of some aquatic plant with her hind legs and deposits an egg within the fold. The egg is a whitish sphere no bigger than a pin's head and surrounded with a gelatinous mass which causes it to adhere tightly to the enveloping leaf. Some three or four weeks afterwards the egg hatches, and the tadpole wriggles out to start the battle of life on its own account. At this stage it is minutely small, with a pair of enormous eyes compared with the creature's bulk, and a feathery gill hangs from either side of the head. Its food consists of the tiny creatures, such as water-fleas and cyclops, found in every stagnant pool. The front legs are the first to appear as it rapidly grows, and by September the hind pair have made their appearance. Soon after this the creature begins to come to the surface to breathe, and the gills are gradually absorbed. Then the young newt quits the water, and, according to some authorities, does not re-enter it until two summers have passed. As soon as the breeding season is over the crests and broad tails of the adults begin to shrink, and at about the end of July the newts leave the water and hide under stones, fallen tree trunks, and such places. Then their skin is rough and dry, and both sexes have the appearance of the one figured in our plates. On wet nights numbers of these summer newts may be met with, hunting for worms. At the approach of winter they force themselves into moss-lined crevices, holes in the roots of trees, or any other damp places well out of the reach of frost. There they spend their time in a state of torpor till the following spring revives them. Britain has only three indigenous species. The largest is the Triton, known also as the Great Water Newt, Great Crested Newt, or Warty Newt. Our illustrations will make only a brief reference to their colours necessary. Both male and female have very rough, warty skins, sometimes black, sometimes of a chocolate colour. Both types are spotted with minute whitish dots. On the under surface the lighter colour varies from lemon-yellow to orange-red, and the darker markings are usually black. The male during the breeding season has a ragged crest along its back and a bright silvery stripe on either side of the tail. The female is without both crest and stripe, the tail being merely broadened for swimming.

The Smooth Newt is by far the commonest of the three. In likely waters it literally swarms at the right time of the year. The male is olive green, mottled or spotted with a darker tint, while underneath the colour is whitish, spotted or blotched with red and yellow. The crest is furnished with a series of knobs and is continuous from the head to the tip of the tail. The female is brown on the back

and rather variable as to colour below. Sometimes it is creamy-white and often yellow, closely or sparsely dotted with small brown dots.

**Palmate Newt.**—This species is much less abundant than either of the other two, and is very locally distributed. It may be readily distinguished for during the breeding season the hind feet of the male are strongly webbed. Instead of tapering to a point as in other newts, the flesh of the tail ends abruptly, but the bone seems to continue as a fine black filament for an eighth of an inch or more. The crest is quite straight, the dorsal parts are greenish, regularly marked with bluish spots, and the under surface is creamy-white with a faint streak of yellow running throughout its length. The female is very difficult to recognise, for it is so much like a small Smooth Newt that even a tutored eye has often difficulty in discriminating between them.

All the British Newts are carnivorous, feeding on tadpoles, water insects, and the soft-bodied creatures of all kinds which they encounter on their wanderings. These batrachians are especially suited to confinement in well-arranged aquaria; there small worms and tadpoles will form their staple diet.

**The Five-legged Newt.**—Certain low forms of life, as crabs, lobsters, lizards, newts, and many others have the power in a greater or less degree of reproducing a lost limb. Everyone has seen an ordinary crab with one of its pincers much smaller than the other. The shorter limb is, in the majority of cases, a reproduced member, the original one having been torn off during a combat or lost in one of a variety of other ways. It often happens that a newt has the misfortune to have part of its tail appropriated by a leech or perhaps its leg crudely amputated by a voracious fish. In either case there would be an attempt to replace the lost member. In our illustration the newt has five limbs, the fifth being a partly developed extra right fore leg. Possibly the creature's shoulder was, at one time, badly injured and from the wound there slowly grew another leg. No doubt the animal's constitution having felt sufficient shock to imagine, as it were, that the original leg had gone, and had therefore grown another to replace it. This is fairly common with lizards. When one of these reptiles naturally breaks off its tail, another gradually grows. If, however, the tail is only injured, perhaps half way up its length, often another slowly makes its appearance at the wound. This continues growing till finally the lizard's tail is strongly forked.

The fifth leg of the newt in question was quite useless to its owner, being without any trace of an elbow, and was also quite incapable of independent motion.

**Common Frog.**—With the first fine days of spring frogs begin to leave their winter quarters and assemble in the ponds. There the eggs are deposited in masses of some hundreds together on the shallows at the edges. When first laid each mass of spawn looks very small and dark, for then it only consists of the black yolks, which are very sticky and adhere closely to one another. This adhesive substance, in which each egg is enveloped, rapidly absorbs water, and becomes distended to a gelatinous sphere with the black yolk in its centre. Of course the outermost eggs of the masses swell first, the water taking some time to penetrate to those within. Our first photograph of the series shows this stage where the outer eggs are swelling. The next illustration depicts the mass still swelling, while the third shows the spawn fully distended. The value of the gelatinous covering will be at once realised by any one who attempts to pick up one of these masses, its slippery nature making the task

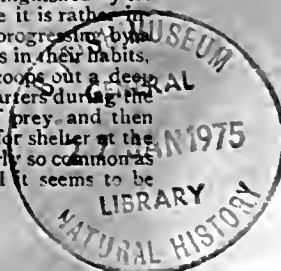
almost impossible. The yolks would be good food for fishes and newts, but the jelly foils all attempts to swallow them. It also serves to keep the eggs a sufficient distance apart for their necessary respiration. After a week or more the black yolks, which are spherical in shape, begin to lengthen one way, and gradually the egg unrolls. Reference to the fourth, fifth, and sixth illustrations in this series will make this clear. If the weather be sunny, bubbles begin to appear all over the the jelly, and sometimes in such numbers that the mass is buoyed up to the surface by their action. When quite unrolled, the young tadpole wriggles its way through the jelly to the water and fixes itself to the spawn by means of a sucker below the head. Then the jelly begins to break up and decompose, turning a greenish colour, and by this time all the tadpoles have congregated on its surface. In a few days more they leave the jelly and swim about, and often in such numbers that the pond looks one wriggling mass of black. Their food seems to be the juices of aquatic plants and the fine green scum that so often collects on the surface of stagnant pools. On this diet they quickly develop, until at last two tiny feet can be made out growing from the root of the tail. At first the legs are quite straight, but as they grow they become folded in that characteristic frog-like attitude. All this time the fore limbs have been developing under the skin just behind the jaws, though they are quite invisible unless the creature is held up to the light. A few days after the hind pair have fully developed the front legs become restless, and after repeated attempts to push through the enveloping skin, one leg manages to burst out, and some hours later it is followed by the other. The tadpole is now able to climb up on the muddy bank of the pond and rest out of water for a while. But at the least sign of danger it hops back again, often tumbling over in its efforts to release its semi-dried tail, which sticks to everything it touches. In the last few days a great change has come over it, for it now has the lungs of a frog, and should it be unable to climb upon something above the water-line, it would speedily drown in the very element which for months has formed its home. The tail begins to wither at the tip, till in a few more days the whole of it has been absorbed. The creature is no longer a tadpole, and it leaves the water and takes up its abode in the wet herbage at the sides of the pond. There it feeds on tiny insects such as aphides and ants, and grows rapidly. As the frog becomes larger it wanders away from the water. During wet weather it may be met with in the daytime, but should the season become dry and hot the creature hides under bark and stones in moist places, not venturing out to feed before twilight. The prey is captured in a very peculiar manner. A frog's tongue is fixed to the floor of the mouth, quite near the front of the lip, and when not in use lies back, pointing down the throat. As soon as the creature spies an insect it quickly crawls within reach, opens its jaws almost at right angles and throws the tongue forward till it touches the prey. As this member is very sticky the insect adheres to it and is drawn back into the mouth. If small the prey is swallowed after a few gulping actions on the part of the frog, but if rather large it is forcibly pushed into the mouth by the use of the fore-legs. These amphibians reach maturity in about three years and probably live on several seasons after that.

**Edible Frog.**—In some parts of the fen-lands of Norfolk and Suffolk this frog may be occasionally met with. Its real home is the Continent, where it specially favours Holland and her numerous water-ways. Some considerable time ago, in the early '40's, an enterprising naturalist named Berney imported some hundreds of

these animals and masses of spawn and deposited them in various parts of the Broads. Since then specimens have been found scattered over the Eastern Counties, though their numbers seem to be gradually decreasing. Whether these frogs existed in Britain previous to this importation is not properly known, though a number of letters written to the "Zoologist" at the time seem to imply that another species had been known in the fens, besides the common variety, prior to this introduction. The edible frog is usually greenish, marked with a number of dark blotches, but the yellow line down the back, as seen in our plate, will at once distinguish it from its common cousin. It is essentially an aquatic frog living always by the side of or in some pond or stream. The eyes and nostrils are specially raised on the head to enable it to see and breathe easily while lying in the water. Though rather bigger than the common species it is not so robust where our climate is concerned, for it has never managed to breed in any quantity in Britain, though it literally swarms in some parts of the Continent.

**Common Toad.**—These creatures seem to be even more plentiful in Britain than frogs, they undergo similar transformations, and feed in the same way. However, toad-spawn is laid not in masses but in long chains. Each one is a string of jelly in which the black yolks are imbedded at regular intervals. In our illustrations of this spawn the enveloping jelly was so transparent that it failed to make itself apparent in the picture. These strings are wrapped round the roots of the rushes and other aquatic plants growing in the ponds, and are sometimes twenty yards in length. The tadpoles hatch out and grow in the same way as described for frogs but their colour is almost dead black, while those of frogs are closely dotted with gold spots, which give them a brownish appearance in their later stages. Toads affect fairly dry situations, except during the breeding season, where they scoop out a hole and there lie all day. At dusk they come out and hunt for worms and nocturnal insects, and display far more agility in capturing them than do frogs. Their gait is usually a laboured crawl and unless disturbed they seldom jump. Toads have extraordinary powers of finding their way about and of remembering their own sleeping places or where food is abundant. They soon become quite tame and display, for the type of the animals, considerable intelligence. Many creatures which naturally feed on frogs absolutely refuse, even when very hungry, to touch a toad. This is probably on account of the wart-like excrescences on the back of the latter which contain some acrid secretion. As soon as a toad is bitten this fluid flows out into the aggressor's mouth. The victim is immediately dropped and the lesson never forgotten. This has probably been the cause of so much fable about the "venomous toad," which is absolutely harmless. It is not until the skin is broken that this secretion flows and even then it is only exceedingly nauseating to the palate, but still absolutely harmless.

**Natterjack Toad.**—This species closely resembles the common toad in many particulars but it may be at once distinguished by its yellow stripe down the middle of the back. In size it is rather inferior to its congener, though it is far more active, progressing by a series of short runs. Natterjacks are very gregarious in their habits, usually living in colonies. There each individual scoops out a deep hole in some dry situation and makes it his headquarters during the daytime. At night-fall they issue forth in search of prey, and then they might be easily mistaken for mice as they run for shelter at the approach of danger. The natterjack toad is not nearly so common as the familiar *B. vulgaris*, but where it occurs at all it seems to be fairly plentiful.



# The Haunted and the Haunters;

OR,

THE HOUSE AND THE BRAIN

BY

LORD LYTTON

This masterpiece in little has been called, and probably is, the best ghost story in the world. It would certainly be difficult to find any to surpass it in its bold and effective introduction of the supernatural, its equally daring, yet consistent and logical, explanation of uncanny appearances.

The present is an exact reprint of the tale as it originally appeared in *Blackwood's Magazine* for 1859. The incomplete version which is printed in Lytton's *Collected Works* leaves many of the incidents very imperfectly explained.

---

Price, in Pretty Parchment Covers, 6d. Net. Post Free, 7d.

THE  
HEAVENLY FOOTMAN;

OR,

A DESCRIPTION OF THE MAN

THAT GETS TO HEAVEN

BY

JOHN BUNYAN

"The Heavenly Footman" is the best known of Bunyan's shorter works. Vigorous, racy, and directly personal in its appeal, it is a sermon which, delivered orally, could never fail to be deeply impressive. And it will command the attention of him who merely reads it better than most sermons he is likely to hear.

The text followed is that printed by Mr. George Olford in the Works of Bunyan, published by Messrs. Blackie & Son in 1860.

# THE MARRIAGE RING;

OR,

THE MYSTERIOUSNESS AND

DUTIES OF MARRIAGE

BY

JEREMY TAYLOR

The Treatise on "The Marriage Ring" occupies Nos. XVII. and XVIII. of the famous "Twenty-five Sermons preached at the Golden Grove; being for the Winter Half-year." These two Sermons have always been the most popular of the great prose-writer's. The text followed is the best, *i.e.*, that of Eden's revised and corrected issue (1862) of Heber's edition of the Whole Works, Taylor's own notes only being given.



THE  
**LADY OF LYONS;**

OR,  
**LOVE AND PRIDE**

A PLAY  
BY  
LORD LYTTON

"The Lady of Lyons" is a thoroughly enjoyable, if unsophisticated, play, and has held the stage since it was written. Though not, as a whole, of great literary merit, it rises in a few blank verse passages to a high poetic level.

The present is an exact reprint of the first edition, a few obvious misprints having been corrected.

# THE TOWER OF NESLE

A PLAY

BY

ALEX. DUMAS, PÈRE

One of the most striking examples of the Romantic drama. A most exciting play in which every speech, every word tells with tremendous force. Thrilling to read, one can imagine the sensation it produced when first acted, at a time when the antagonism between the supporters of the Classical and Romantic drama was at its height.

---

Price, in Pretty Parchment Covers, 6d. Net. Post Free, 7d.



